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600,000 Gallon Mountain Road Storage Tank Condition Assessment Report

Village of Irvington, NY

Prepared For:
Village of Irvington
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R L Merithew Inc.

Date
October 19, 2009

General Information

INTRODUCTION

On September 24, 2009, Utility Service Co., Inc. and R. L. Merithew conducted a visual and ROV (Remote Operated Vehicle) inspection of the 600,000 gallon ground storage tank off of Mountain Road. The purpose of the inspection was to determine the condition of the **coatings** and **structure**, and evaluate the tank for compliance with **sanitation** guidelines, **safety** & **security** regulations and guidelines in accordance with AWWA, OSHA, New York DOH, US EPA, and US Dept of Homeland Security and related state and federal agencies.

The information gained from this inspection will be used to compile recommendations for ongoing maintenance and to offer a contractual agreement to provide this service. In this report, you will find a description of the condition of this tank along with photographs to support the recommendations.

TANK DETAILS

CAPACITY:	600,000 Gallons	**DESIGN:**	Standpipe
INSPECTION DATE:	September 24, 2009	**INSPECTORS:**	Marty Mazzella Chad Merithew
CONSTRUCTION STYLE:	Welded Steel	**CONSTRUCTION DATE:**	~1959
BUILDER:	Unknown	**HEIGHT/ DIMENSION:**	50′ Diameter 42′ Height
EXTERIOR COATING:	Urethane	**EXTERIOR LEAD/CHROMIUM PRESENCE:**	22,210 ppm Lead Detected 5,310 ppm Chromium Detected
INTERIOR COATING:	Epoxy	**INTERIOR LEAD/CHROMIUM PRESENCE:**	601 ppm Lead Detected 133 ppm Chromium Detected

ESTIMATED REPLACEMENT VALUE

The replacement cost of this tank is estimated at $850,000 and $1.0 Million.

Exterior Coatings Conditions

TANK SHELL

The exterior coating system is in very poor condition. The exterior coating system is exhibiting areas of corrosion, mildew, chalking, and delamination of the finish coat. The appearance of the coating system is poor with areas of mildew, chalking and oxidation. There are localized areas of heavy rust on the decorative pilasters, sidewalls and roof of the tank.

The dry film thickness on the exterior shell is between 5.8 and 11.7 mils. The adhesion of the exterior coatings is poor and not suitable for overcoating. There is evidence of lead based paint or primer under the urethane coating. (See photos # 1 – 4).

TANK ROOF

The roof coatings are in very poor condition. The coating is thinning and heavy corrosion is apparent on approximately 15 to 20% of the surface area. (See photos # 5 - 8).

RECOMMENDATIONS

- **Within the next year, the exterior coating system should be properly prepared by sandblasting to a SSPC #6 Standard and coated with a 3 coat urethane system to prevent permanent damage to the tank and any further loss of metal.**
- **Additionally, the decorative pilasters should be removed due to the severe corrosion in several areas. Relocation of the inlet pipe may be necessary once the pilasters are removed.**
- **Due to the age and poor condition of the tank it is recommended that the Village evaluate the cost of repairing the tank against the cost of constructing a new tank on this site.**

Interior Coatings Conditions

ROOF AND AREA ABOVE HIGH WATER LEVEL

The interior epoxy coating system is in poor condition. There is evidence of moderate to severe corrosion above the high water level on the roof panels. There is one area of significant corrosion near the inlet pipe. (See photos # 9 - 11)

SIDEWALLS

The coating system is in fair to poor condition. The interior sidewalls have areas of blistering, delamination, and heavy buildup of organic materials. (Refer to ROV DVD).

FLOOR

The interior coating system on the tank floor has light silt cover and is in fair condition. Of the visible areas on the floor, there appears to be areas of blistering of coating and light corrosion. (Refer to ROV DVD)

RECOMMENDATIONS

- **In order to protect the structural integrity of the tank for the long term, within the next year it is recommended that the interior of the tank be completely renovated by removing the existing lining by sandblasting to an SSPC #10 Standard, and relining with a new 3 coat epoxy system. The coating systems are failing and the corrosion on the roof panels and walls must be addressed.**

Safety/Sanitation/Structural/Security Conditions

SAFETY

Ladders

The exterior ladder is located on the interior of one of the decorative pilasters and does not comply with OSHA guidelines. The ladder does not contain a suitable cable style safety climbing device. (See photos # 12 & 13.)

No interior ladder is present.

After the external pilasters are removed, it is recommended to install a functional ladder gate on the exterior ladder.

Shell Access Hatch

This tank is equipped with two 24" round, bolted access hatches. (See photos # 14 & 15).

Secondary Roof Access Hatch

This tank is not equipped with a secondary roof access hatch.

Aviation Warning Lights and Antenna

This tank is not equipped with an aviation warning light.

There are no antennas on the tank**.**

SANITATION

Roof Hatch

The roof hatch is 24-inches square and meets OSHA and AWWA guidelines which require that roof hatches be framed 4" to 6" above the surface of the roof at the opening and that it should be fitted with a solid watertight cover which overlaps the framed opening and extends down around the frame a minimum of two inches to prevent contaminated rainwater from entering the tank. There is severe corrosion on the hatch curb and on the underside of the hatch cover. The roof hatch was closed, but unlocked at the time of our inspection. (See photos #17 & 18)

It is recommended to replace the hatch curb and cover and lock roof hatch cover.

Roof Vent

NY DOH and AWWA guidelines require that a tank have a vent, which is both freeze-proof and insect-proof, on the top of the tank to prevent contamination from birds, bats and insects. These guidelines also suggest the screen be protected from direct contact with the elements.

The cupola on the tank roof has vent holes with screens over the holes. When the cupola and pilasters are removed a new 30" or 36" vent will need to be installed. (See photos #19 & 20)

The top of the cupola is severely corroded and has a large open area where the steel has completed rusted away. This is sanitary hazard. (See photo #6)

It is recommended install new roof vent to cover the existing opening in the cupola.

Overflow

The overflow complies with AWWA and NY DOH guidelines, which require the overflow end 12-inches to 24-inches above grade and have a screen and/or flapper gate. The overflow pipe extends to grade and is equipped with a flapper cover. (See photo # 21 - 23)

STRUCTURAL

Ring Wall Foundation

The foundation appears to be in good condition. The grout at the tank base is deteriorating and should be re-grouted during the next renovation. The top of the concrete foundation is not coated as recommended by most standards. (see photo # 24 - 25).

It is recommended to repair and/or replace the areas of deteriorating grout and coat the concrete foundation with an appropriate epoxy to protect from freeze/thaw damage.

Anchor Chairs and Bolts

There are no anchor chairs and bolts on this tank.

SECURITY

Site

The site has a chain across the driveway to the tank. There is no fencing around the tank. Current US Dept. of Homeland security guidelines suggest that all water tank sites be fenced and 'Tampering with this facility is a Federal Offense" signs be posted on and around the site. There are wooded areas near the tank site, but no fencing borders the property to deter intrusion. (See Photos #26 - 28)

Due to the location of the tank, it does not appear to be at significant risk for tampering or vandalism; however we recommend the use of signs to deter intrusion. The site should be fenced and trees that are within 15 feet of the tank should be removed.

Tank

The roof hatch was not locked as previously mentioned. The lock needs to be replaced.

SUMMARY AND RECOMMENDATIONS

SUMMARY

Overall this tank is in poor condition; the exterior coating system is in very poor condition and should be scheduled for a full renovation within the next year. The tank will require full containment, sandblast, and coating with a 3 part system of primer, epoxy, and urethane. The concrete foundation should be re-grouted where needed and coated with an appropriate epoxy.

The interior coating system is in poor condition. It should be removed and re-lined within the next year to prevent further deterioration of the structural components that are exhibiting corrosion. In addition to the exterior and interior coating conditions, several modifications are recommended to bring this tank into current standards. The safety and sanitary issues are the most important.

RECOMMENDATIONS

- **Within the next year, the exterior coating system should be properly prepared by sandblasting to a SSPC #6 Standard and coated with a 3 coat urethane system to prevent permanent damage to the tank and any further loss of metal.**
- **In order to protect the structural integrity of the tank for the long term, within the next year it is recommended that the interior of the tank be completely renovated by removing the existing lining by sandblasting to an SSPC #10 Standard, and relining with a new 3 coat epoxy system. The coating systems are failing and the corrosion on the roof panels and weld seams must be addressed.**
- **Relocate the inlet pipe and chlorine tube to enter the tank through the lower tier sidewall.**
- **Install and active mixing system to provide homogeneous temperature and disinfectant residual stability**
- **Remove the decorative pilasters and roof cupola since they do not serve any structural purpose.**
- **Replace existing roof vent with new vent.**
- **Install a new cable style safety climb device.**
- **Install a new, functional ladder gate to prevent unauthorized access onto the tower.**
- **Install fencing around site and signs to deter tampering and vandalism.**
- **Remove all trees and brush that are within 15 feet of tank sidewall.**

600,000-Gallon
Mountain Road Tank
Irvington, NY

Photo #1 Mildew staining, corrosion, chalking, and coating failure on sidewalls.

Photo #2 Corrosion, mildew staining and overall coating failure on sidewall.

Photo #3 Corrosion and delamination. Overall the exterior coatings are in very poor condition.

Photo #4 Severe corrosion on pilasters. It is recommended to remove the pilasters.

Photo #5 Coating failure on roof.

Photo #6 Coating failure, severe corrosion, and metal loss on root cupola. Opening at top is a sanitary concern where birds, bugs and other vermin could enter the tank.

Photo #7 Severe corrosion on roof inside cupola. Holes in pilasters provide openings for birds, bugs and other vermin to enter the tank opening. (arrow)

Photo #8 Sever corrosion on pilaster.

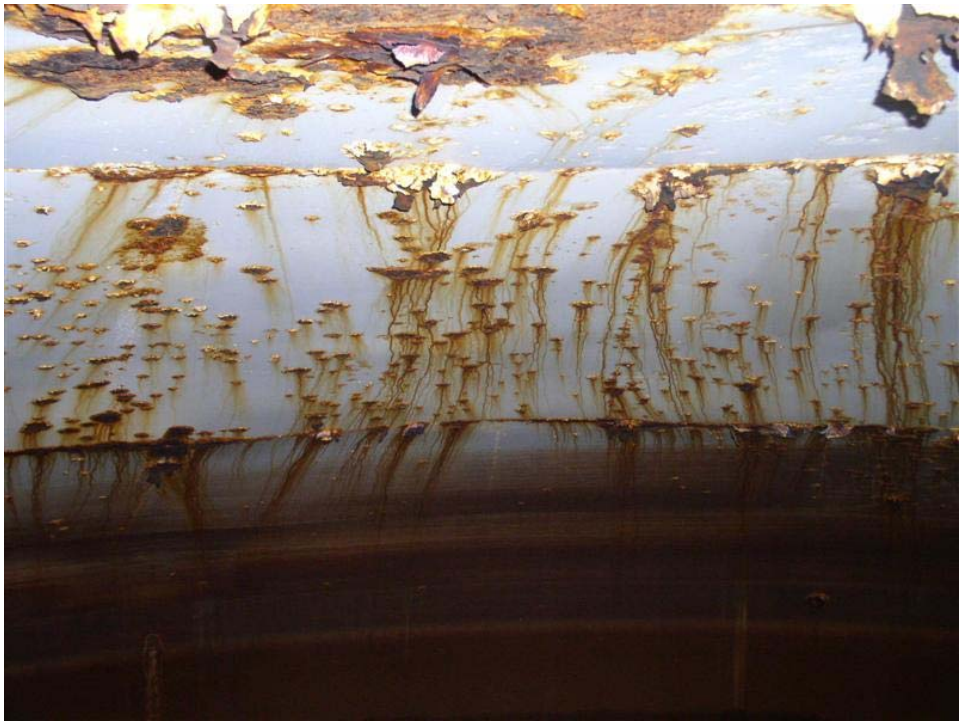

Photo #9 Severe corrosion on roof panels of tank interior.

Photo #10 Corrosion on roof around fill pipe and chlorine tube.

Photo #11 Tank sidewalls have active corrosion and heavy organic staining.

Photo #12 Access ladder is in fair condition and does not have a suitable safety climb system.

Photo #13 Dome roof ladder is in fair condition.

Photo #14 Shell manway complies with current standards and is in fair condition.

Photo #15 Secondary bolted shell manway. Note severe corrosion on base of pilaster.

Photo #16 Secondary roof opening is the vent/cupola.

Photo #17 Primary roof hatch that complies with current standards, but curb and cover are in poor condition and should be replaced.

Photo #18 Severe corrosion on roof hatch curb. Recommend to replace curb and hatch cover.

Photo #19 Vent for tank is provided by square holes cut into roof cupola. Screens are damaged allowing birds, insects and other pests to enter the tank and contaminate the finished water.

Photo #20 Screen is loose and corroding.

Photo #21 Overflow pipe is likely on the inside of this pilaster and exits underground to the stream on the south side of tank.

Photo #22 Overflow discharge is properly installed with flapper cover.

Photo #23 Foundation is in good condition. A layer of mortar was installed around the base to protect the grouting. Mortar ring should be removed and grout repaired. Recommend coating the foundation with epoxy.

Photo #24 Ringwall foundation is in good condition. Grout appears to be intact (arrow), despite the decay of the mortar ring around tank base.

Photo #25 Ringwall foundation.

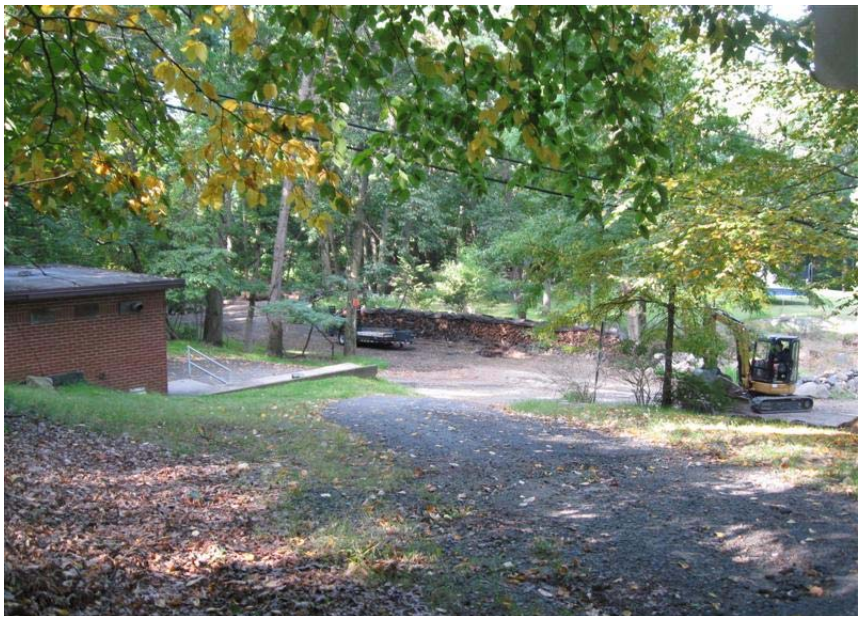

Photo #26 Access to site is not very secure. No fencing around site. No security or warning signs are posted at tank site.

Photo #27 Trees should be removed from perimeter of tank at least 15 feet away.

Photo #28